

Stethophotopsis, a New Genus of Sphaerophthalmini (Mutillidae: Sphaerophthalminae) with a Brachypterous Male from Arizona

JAMES P. PITTS AND JOSEPH V. MCHUGH

Department of Entomology, University of Georgia, Athens, GA 30602, USA

Abstract.—A new genus of Mutillidae from southern Arizona with an achypterous male, *Stethophotopsis* Pitts, is described and illustrated, including the new species *Stethophotopsis maculata* Pitts. The genus can be distinguished from males of other sphaerophthalmine genera by the posterior position of the mesosternal processes, the dilated and elongated condition of the cuspis and the absence of plumose pubescence on the cuspis.

The subfamily Sphaerophthalminae includes approximately 71 genera in two tribes, Sphaerophthalmini and Dasylabrini. Dasylabrini are restricted to the Old World while Sphaerophthalmini occur in the New World, Japan, and in the Mediterranean and Australian regions (Brothers 1975). Of the 60 genera of Sphaerophthalmini, 55 occur in the New World. This tribe is distinguished by two synapomorphies apparent in both sexes: the approximately hemispherical, smooth and polished condition of the eye and the presence of plumose pubescence (Brothers 1975).

In a study of Mutillidae from the southwestern United States, two male specimens of an undescribed brachypterous species were found. Although no phylogenetic hypothesis is available for genera of Sphaerophthalminae, this new species is unique in several features considered to be of generic-level importance for the subfamily. This new genus and species are described, illustrated and discussed below.

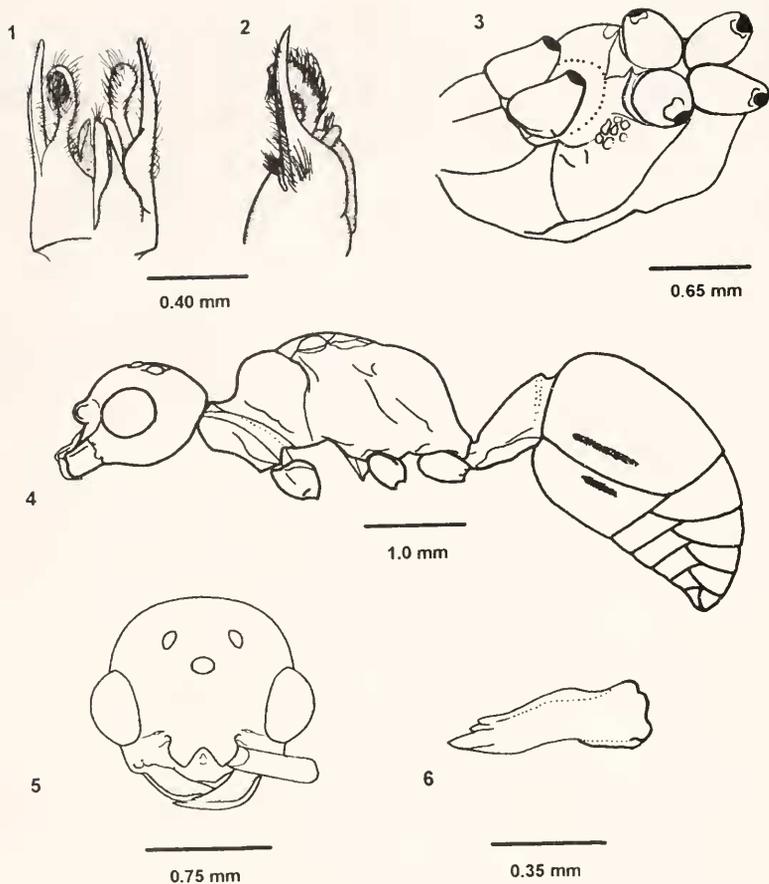
MATERIALS AND METHODS

We follow the terminology suggested by Menke (1993) for the scutum rather than that of Schuster (1958). The term "tibial spurs" is used instead of "calcaria."

We denote the second, third, etc. metasomal tergites as T2, T3, etc. and the second, third, etc. metasomal sternites as S2, S3, etc.

Stethophotopsis Pitts, new genus (Figs. 1–6)

Male.—*Head:* As wide as thorax. Ocellular distance (Fig. 5) $2\times$ width of lateral ocellus. Clypeus forming a trapezoidal, truncated anterior lobe, slightly to moderately depressed below dorsal mandibular rim; clypeal base tuberculate. Malar space (Fig. 4) $0.5\times$ maximum eye width. Gena well developed, width approximately equal to width of mandibular base. Mandible tridentate apically, ventral margin with slight excision, not subtended by distinct sub-basal tooth. Antennal scrobes carinate above, with tubercle. First flagellomere $1.6\times$ length of pedicel; second flagellomere $1.3\times$ length of first flagellomere. Maxillary palp 6-segmented, labial palp 4-segmented. *Mesosoma:* Mesoscutum with notali present posteriorly, absent or obscure on anterior third of mesoscutum. Tegula glabrous. Wings brachypterous, reduced to $0.5\times$ length of tegula. Mesosternum (Fig. 3) armed with pair of densely pubescent, triangular tapering processes, originating near midline immediately anterior to me-



Figs. 1-6. *Stethophotopsis maculata*, Holotype. 1, Genitalia lateral view. 2, Genitalia, dorsal view on right, ventral view on left. 3, Sternum (legs except coxae, sculpture and pilosity omitted). 4, Body, lateral view (wings, legs except coxae, sculpture and pilosity omitted). 5, Head, frontal view (sculpture and pilosity omitted). 6, Left mandible.

socoxae, appearing to cup anterior margin of mesocoxae. Tibial spurs 1-2-2; tibiae slender, not flattened. *Metasoma*: First segment (Fig. 4) petiolate, slender, not nodose, moderately constricted dorsally and laterally at apex, distal width much less than that of base of segment 2. Segment 2 with both tergal and sternal felt lines. Apical margins of segments 1 and 2 with plumose pubescence. Pygidium short, subtruncate at apex. Hypopygium transverse, broader than long, laterally undefined. Paramere arcuate, stout at base and weakly dorsoventrally flattened. Cusps (Figs. 1, 2) elongate, about equal

to free length of paramere, curved ventrally, basal portion cylindrical, distal portion dilated and weakly concave on ventral surface, ventral surface with dense simple pubescence distally. Digitus devoid of pubescence.

Female.—Unknown

Etymology.—From the Greek *stetho* "chest" + *photopsis*, a commonly used sphaerophthalmine suffix, referring to the characteristic sternal processes of this genus. Gender feminine.

Distribution.—USA, Southern Arizona.

Type species.—*Stethophotopsis maculata* sp. nov.

Stethophotopsis maculata Pitts, new
species
(Figs. 1–6)

Male.—*Length*: Holotype 7 mm, paratype 8 mm. *Color*: Head, thorax, petiole, second tergum, coxae, trochanters and tarsi brownish-yellow. Femora and tibiae dark brown. Third through seventh abdominal segments reddish-brown. Two round black maculations on anterior fourth of T2 with deep punctation, appearing raised above surrounding disk. Pubescence of head, pleural region, mesosternum and meosomal sternites pale. Pubescence of thoracic dorsum golden-brown to pale. Pubescence of abdominal tergites pale except black in areas of tergal maculations. *Head*: Head as wide as thorax, rounded behind eyes in dorsal view. Ocelli salient, ocellular distance (Fig. 5) slightly greater than $2\times$ width of lateral ocellus, interocellar distance slightly greater than $2\times$ width of lateral ocellus. Clypeus anteriorly forming a trapezoidal, truncated anterior lobe, slightly to moderately depressed below dorsal mandibular rim. Malar space $0.5\times$ maximum width of eye. Gena (Fig. 4) well developed, width approximately equal to width of mandibular base. Mandible (Fig. 6) tridentate apically, ventrally with a slight excision not subtended by a distinct sub-basal tooth, with ventral carina ending before midlength and with complete dorsal carina, raised at midlength. Apical mandibular teeth with 1st tooth basal width $4\times$ and length $6\times$ the 3rd tooth; 2nd tooth basal width $1\times$ and length $2\times$ the 3rd tooth. Antennal scrobe carinate above, with small tubercle. First flagellomere $1.6\times$ length of pedicel; second flagellomere $1.3\times$ length of first flagellomere. Ridges of hypostomal region unmodified. Punctuation of vertex confluent. *Mesosoma*: Pronotum, scutum and scutellum shallowly, coarsely, confluent punctate. Scutum with subcomplete notauli, absent on anterior third of scutum. Tegula glabrous. Propodeum coarsely

punctate. Mesopleuron with oblique sulcus indistinct; sculpture reticulate throughout. Mesosternum (Fig. 3) armed with pair of triangular, tapering processes, originating immediately anterior to mesocoxae, situated slightly medially from center of coxae, covered with simple pubescence; sinus broadly U-shaped. Mesosternum tridentate. Mesocoxae approximate and unarmed; metacoxa and trochanter unarmed. Wings brachypterous, reduced to 0.5 length of tegula. *Metasoma*: First segment (Fig. 4) petiolate, slender, not nodose, posteriorly moderately constricted dorsally and laterally, posterior width much less than base of second segment. T1 sparsely punctate, punctations separated by at least $2\times$ width. Anterior margin of T2 coarsely, confluent punctate becoming shallowly, sparsely punctate posteriorly; S2 moderately punctate, anterior fourth with median longitudinal carina; sternal felt line approximately $0.75\times$ length of tergal felt line. Posterior margin of T1 and T2 with plumose pubescence. Pygidium transverse, broader than long and subtruncate at apex. Hypopygium transverse, broader than long, laterally undefined by carinae. Paramere (Figs. 1, 2) arcuate, stout at base and little dorso-ventrally flattened, tapering, devoid of long setose pubescence. Cuspis elongate, reaching nearly to apex of paramere, outwardly curved, distal portion distinctly dilated and slightly spatulate, basal portion cylindrical; distal portion with dense, long simple pubescence, basal half sparsely and minutely pubescent. Digitus devoid of pubescence.

Female.—Unknown

Type material.—Holotype: "Brown Canyon, Baboquivari Mountains, Arizona, September 6, 1958, Stange and Menke" (LACM). Paratype: Arizona, Santa Cruz County, Madera Canyon, Santa Rita Mountains, 17–18.VIII.1949, Lloyd Martin (LACM).

Etymology.—From the Latin *maculata* "spotted," in reference to the pair of black

maculations on the anterior margin of the second tergite.

Comments.—The paratype closely resembles the holotype in most features except that it is slightly larger.

DISCUSSION

Stethophotopsis is a distinct genus in the Sphaerophthalmini (subtribe: Sphaerophthalmina). The unique sternal processes and the dilated, spatulate and elongate condition of the genitalic cuspis are apparently autapomorphic for the genus. *Stethophotopsis* will key to subfamily Sphaerophthalminae without difficulty in existing keys by Brothers (1993, 1995). In Schuster's (1958) key to the sphaerophthalmine males of the North American Southwest, *Stethophotopsis* fails to key beyond the first couplet, where it may be diagnosed by the autapomorphies listed above.

Lelej and Nemkov (1997) presented a phylogeny for the subfamilies of Mutillidae and synonymies for mutillid genera. Because this work remains controversial (Brothers 1999), we follow Schuster's (1958) classification of the sphaerophthalmine genera. The subfamilies recognized here are those presented by Brothers (1975, 1999). Currently, there is no phylogenetic hypothesis available for the subtribe Sphaerophthalmina. Although it is apparent that *Sphaerophthalma* is paraphyletic (pers. obs.), the other genera of Sphaerophthalmini may be monophyletic.

The new species described here cannot be placed in any of the established genera of Sphaerophthalmini because it differs from each one by characters considered to be of generic-level significance. In the discussion that follows, we distinguish *Stethophotopsis* from the related genera with which it is most likely to be confused.

Morsyma Fox, *Prototophotopsis* Schuster and *Photomorphus* Viereck share some characters which are of taxonomic significance with *Stethophotopsis*, although they differ in genitalic morphologies and vari-

ous other diagnostic features. *Morsyma* is apterous and is superficially similar to *Stethophotopsis* because of its degree of brachyptery; however, *Morsyma*, has a broadly sessile abdomen, has smaller ovate eyes and lacks sternal processes, notali and a tooth on the antennal scrobe (Schuster 1958). *Prototophotopsis* shares with *Stethophotopsis* a tridentate mandible and the lack of a ventral mandibular tooth, but it has the anterior pronotal margin distinctly emarginate, notauli absent, mesosternum unarmed and pubescence simple (Cambra and Quintero 1997). *Photomorphus* and *Stethophotopsis* have well developed sternal felt lines and a tuberculate clypeal base; however, *Photomorphus* has dentate ridges on the anterior margin of the mesosternum, has a ventral mandibular tooth, and either lacks or has only vestigial plumose pubescence (Schuster 1958).

Some subgenera of *Sphaerophthalma* Blake (*Sphaerophthalma*, *Physetapsis* and *Photopsioides*) and species of *Odontophotopsis* Viereck have a similar hypopygium morphology to that of *Stethophotopsis*. Also, some small individuals of *Sphaerophthalma* and *Odontophotopsis* are similar in having incomplete notauli. The mesosternum of *Sphaerophthalma*, however, is never modified with dentate ridges or processes. In *S.* (*Sphaerophthalma*) and *S.* (*Photopsioides*) the cuspis also is dilated; however, it bears plumose pubescence and is not spatulate. For *Odontophotopsis*, the cuspis is rod-like and the paramere is much longer than the cuspis. *Odontophotopsis* (*Odontophotopsis*) has small dentate processes situated on the mesosternal midline far removed from the mesocoxae and *O.* (*Periphotopsis*) has swollen, longitudinal processes running the length of the mesosternum.

Dilophotopsis Schuster and *Acrophotopsis* Schuster differ greatly from *Stethophotopsis* in having a large dilated sub-basal tooth on the mandibles, dorsoventrally flattened parameres and strongly depressed hypopygia with distinctly carinate lateral mar-

gins (Schuster 1958), all of which are lacking in *Stethophotopsis*.

Stethophotopsis shows the greatest apparent affinity to the genus *Acanthophotopsis* Schuster. These genera share the following characters: (1) the clypeus is truncate and depressed below mandibular rim, (2) the genitalic cuspis is flattened and dilated and (3) the mandibles are not dentate below but have a small excision (Schuster 1958). Despite these similarities, *Acanthophotopsis* differs in a number of important characters warranting separation, including the following: (1) loss of a mesotibial spur, (2) flattened and arcuate mesotibia, (3) cylindrical mesosternal processes arising anterior to the posterior margin of the mesosternum (whereas *Stethophotopsis* has triangulate ridges that arise from the posterior margin of the mesosternum and appear to cup the anterior margin of the mesocoxae), (4) complete notauli, (5) anteriorly reduced gena and (6) sternal felt line absent.

ACKNOWLEDGEMENTS

We thank Denis Brothers (Peitermaritzburg, South Africa), Donald Manley (Clemson, SC) and Theresa Pitts-Singer (U.S. Forest Service) for critically review-

ing the manuscript. Roy Snelling graciously loaned the specimens from the Natural History Museum of Los Angeles County, Los Angeles, California (LACM).

LITERATURE CITED

- Brothers, D. J. 1975. Phylogeny and classification of the aculeate Hymenoptera, with special reference to Mutillidae. *University of Kansas Science Bulletin* 50: 483-648.
- Brothers, D. J. 1993. Family Mutillidae. Pp. 188-203. In: Goulet, H. and J.T. Huber (eds.), *Hymenoptera of the World: An Identification Guide to the Families*. Centre for Land and Biological Resources Research, Ottawa, Ontario. Research Branch, Agriculture Canada, Publication 1894/E. 668 pp.
- Brothers, D. J. 1995. Mutillidae. Pp. 541-548. In: Hanson, P.E. and I.D. Gauld (eds.), *The Hymenoptera of Costa Rica*, Oxford University Press, Oxford, 893 pp.
- Brothers, D. J. 1999. Phylogeny and evolution of wasps, ants, and bees (Hymenoptera, Chrysidoidea, Vespoidea, and Apoidea). *Zoologica Scripta* 28: 233-249.
- Cambra T., R. A. and D. Quintero A. 1997. A Revision of *Protophotopsis* Schuster (Hymenoptera: Mutillidae). *Journal of Hymenoptera Research* 6: 263-272.
- Lelej, A. S. and P. G. Nemkov. 1997. Phylogeny, evolution and classification of Mutillidae (Hymenoptera). *Far Eastern Entomologist* 46: 1-24.
- Menke, A. S. 1993. Notauli and parapsidal lines: just what are they? *Sphex* 24: 9-11.
- Schuster, R. M. 1958. A revision of the sphaerophthalmine Mutillidae of America north of Mexico. II. *Entomologica Americana* 37: 1-130.